Sediment Trends in Rivers Across the United States, 1972 to 2012

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USGS, Lower Mississippi-Gulf Water Science Center

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USGS, Oregon Water Science Center

USGS

National-Scale Trend Study

- National Water-Quality Assessment (NAWQA) Project of the National Water Quality Program
- Plus nutrients, major ions, carbon, pesticides, and ecology
- U.S. including Puerto Rico
- Max trend 1972-2012, also 1982, 1992, and 2002 start years
- WRTDS used to estimate trends for most constituents

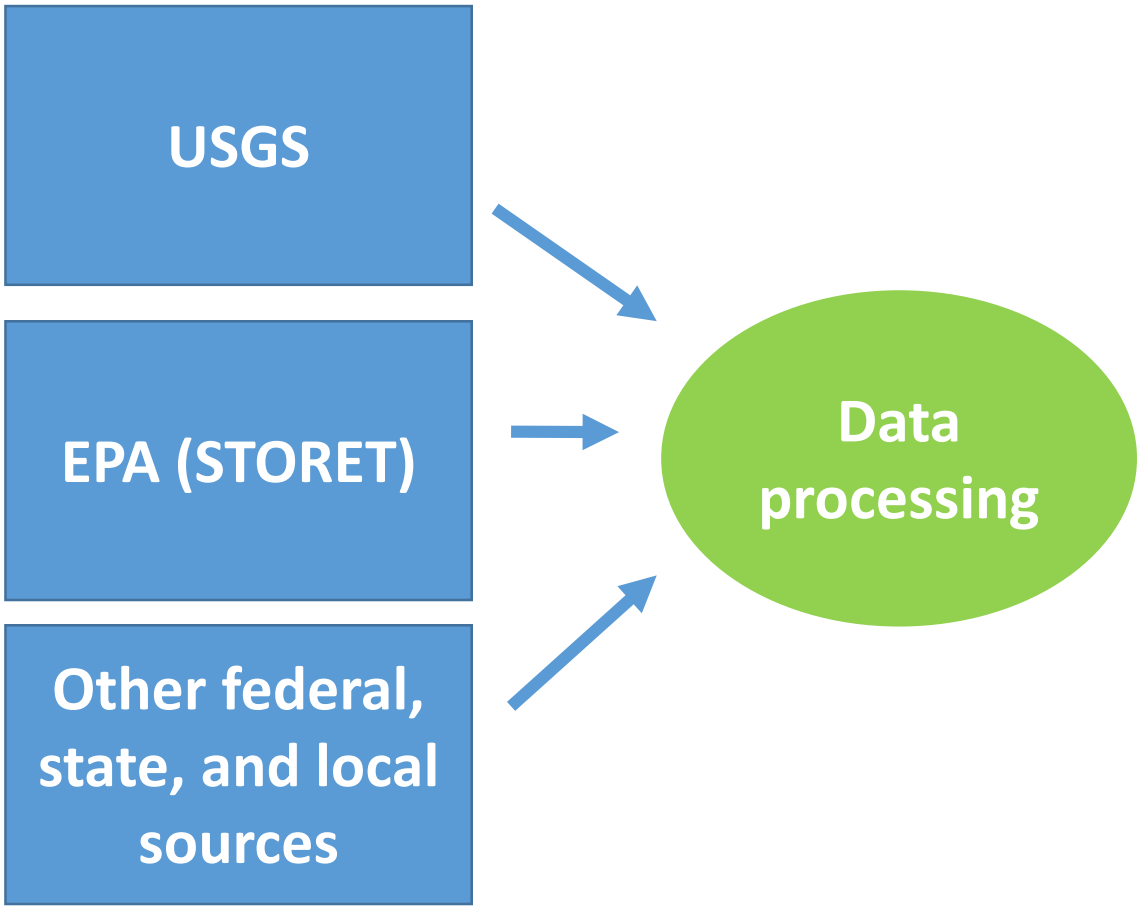
Data Sources & Processing

USGS

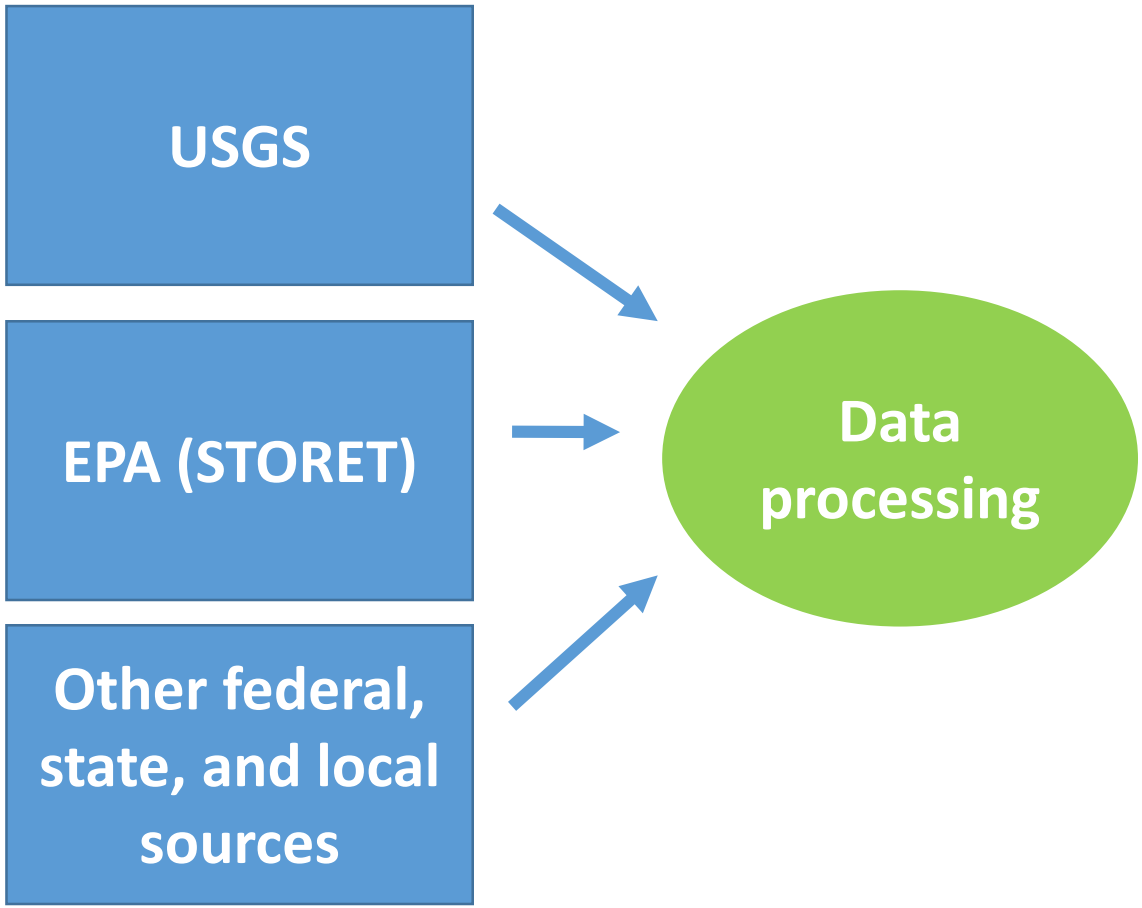
EPA (STORET)

Other federal, state, and local sources

Data Sources & Processing



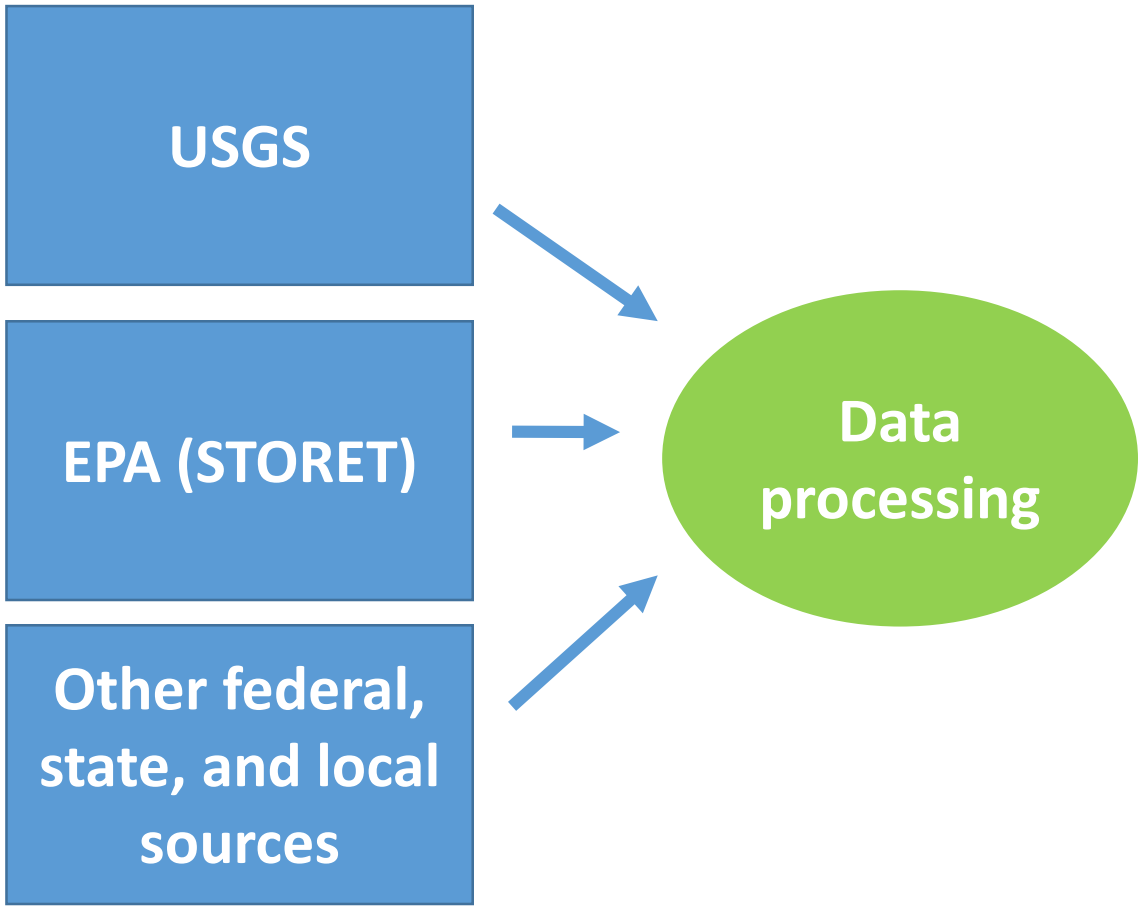
Data Sources & Processing



Data screens

- Quarterly data in first 2 and last 2 years of trend period
- Quarterly data in 70% of trend period

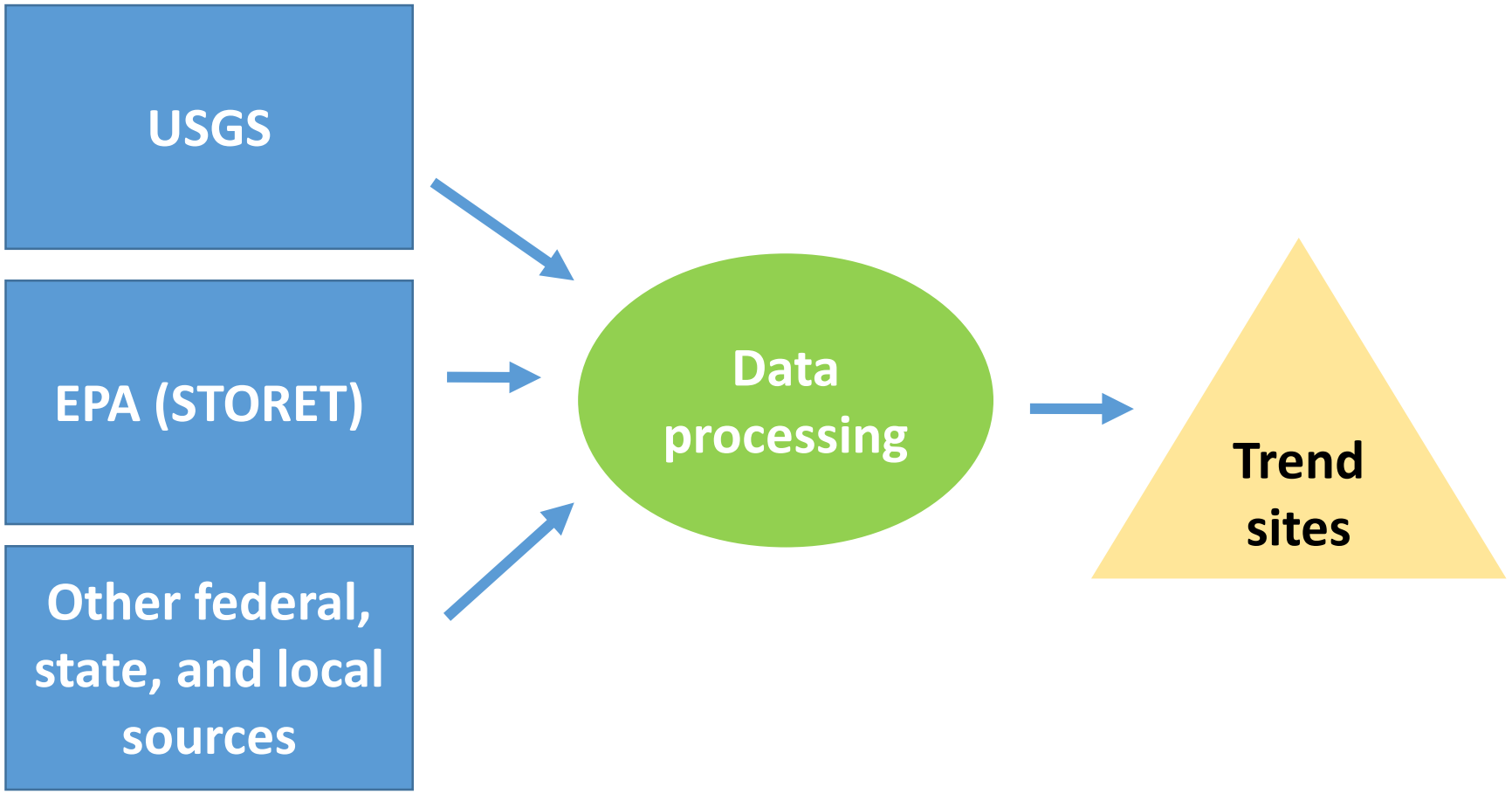
Data Sources & Processing



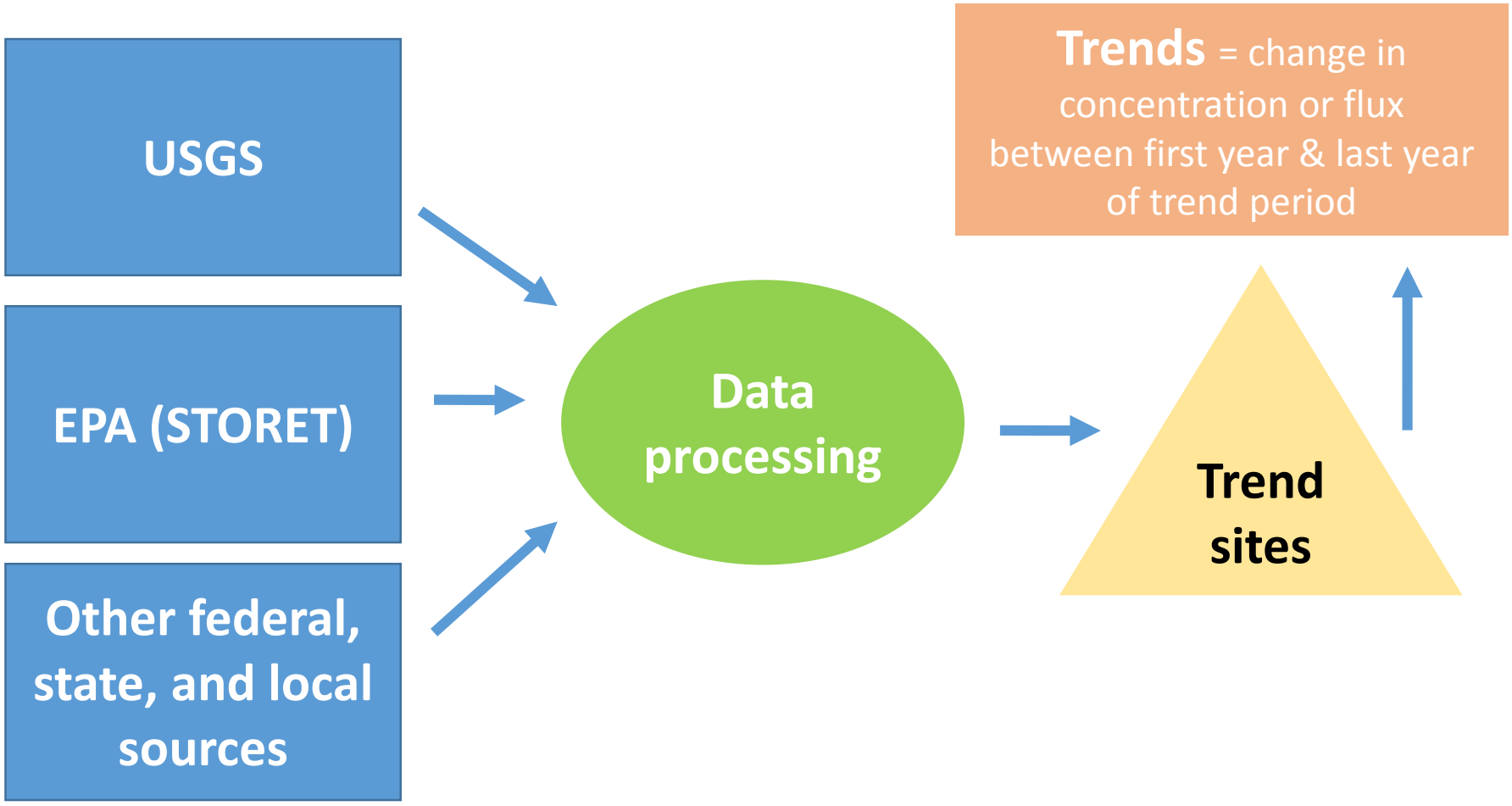
Data screens

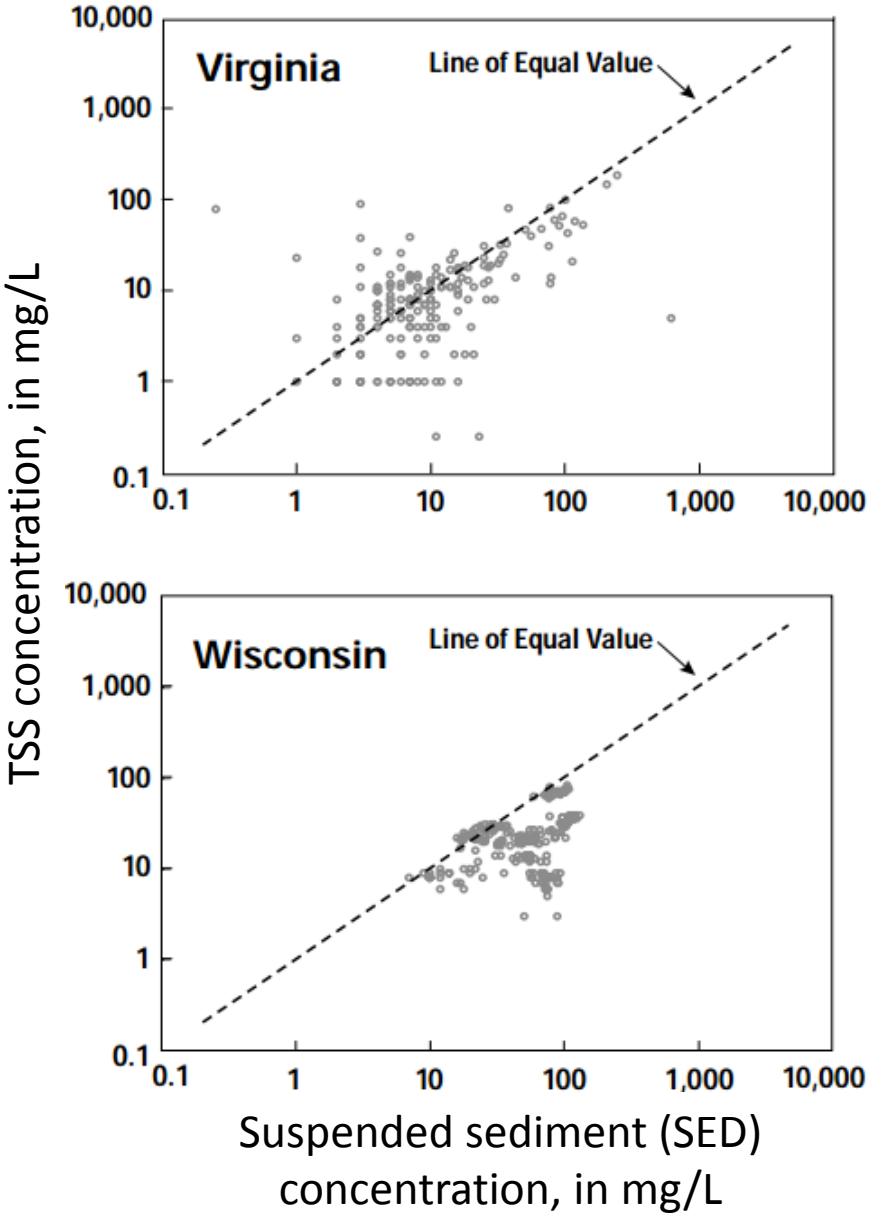
- Quarterly data in first 2 and last 2 years of trend period
- Quarterly data in 70% of trend period
- Paired w/ streamgage
- Passed high flow screens

Data Sources & Processing



Data Sources & Processing





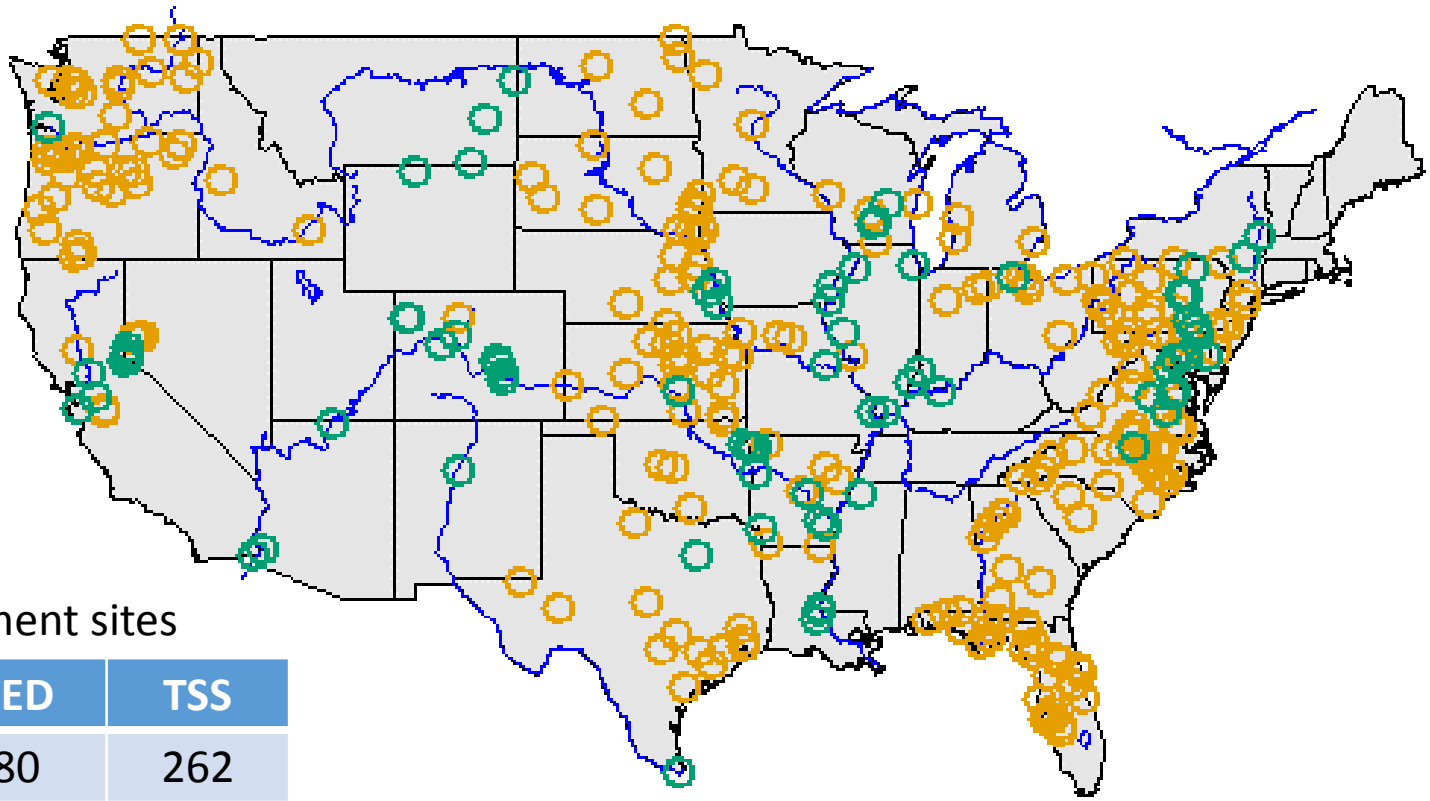
SED and TSS

Suspended sediment (SED)

Total suspended solids (TSS)

Gray, J.R., Glysson, G.D., Turcios, L.M., Schwarz, G.E., 2000**, Comparability of Suspended-Sediment Concentration and Total Suspended Solids Data**, Water-Resources Investigations Report 00-4191.

2002 – 2012 Sediment Trend Sites

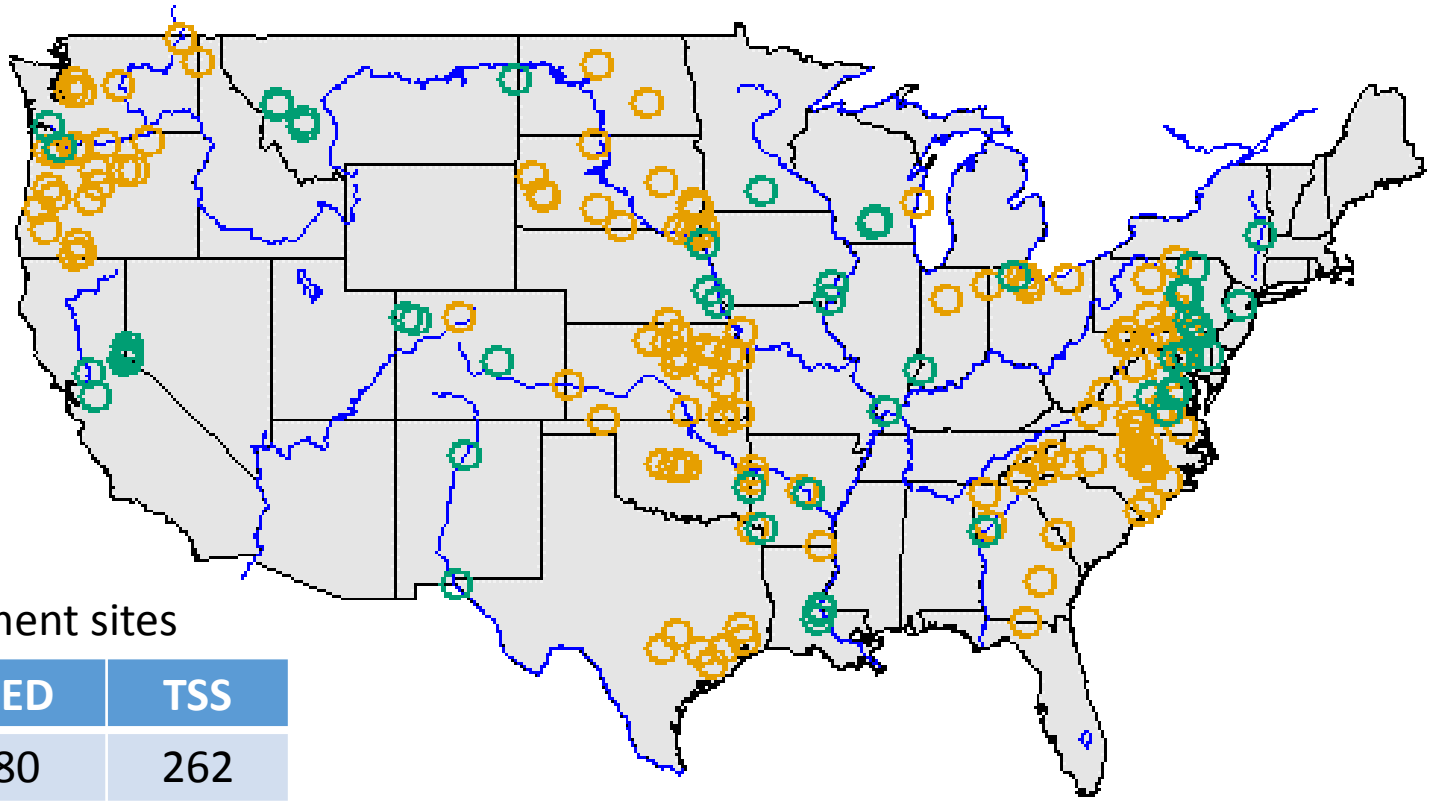


Number of sediment sites

Start year	SED	TSS
2002	80	262

USGS

1992 – 2012 Sediment Trend Sites

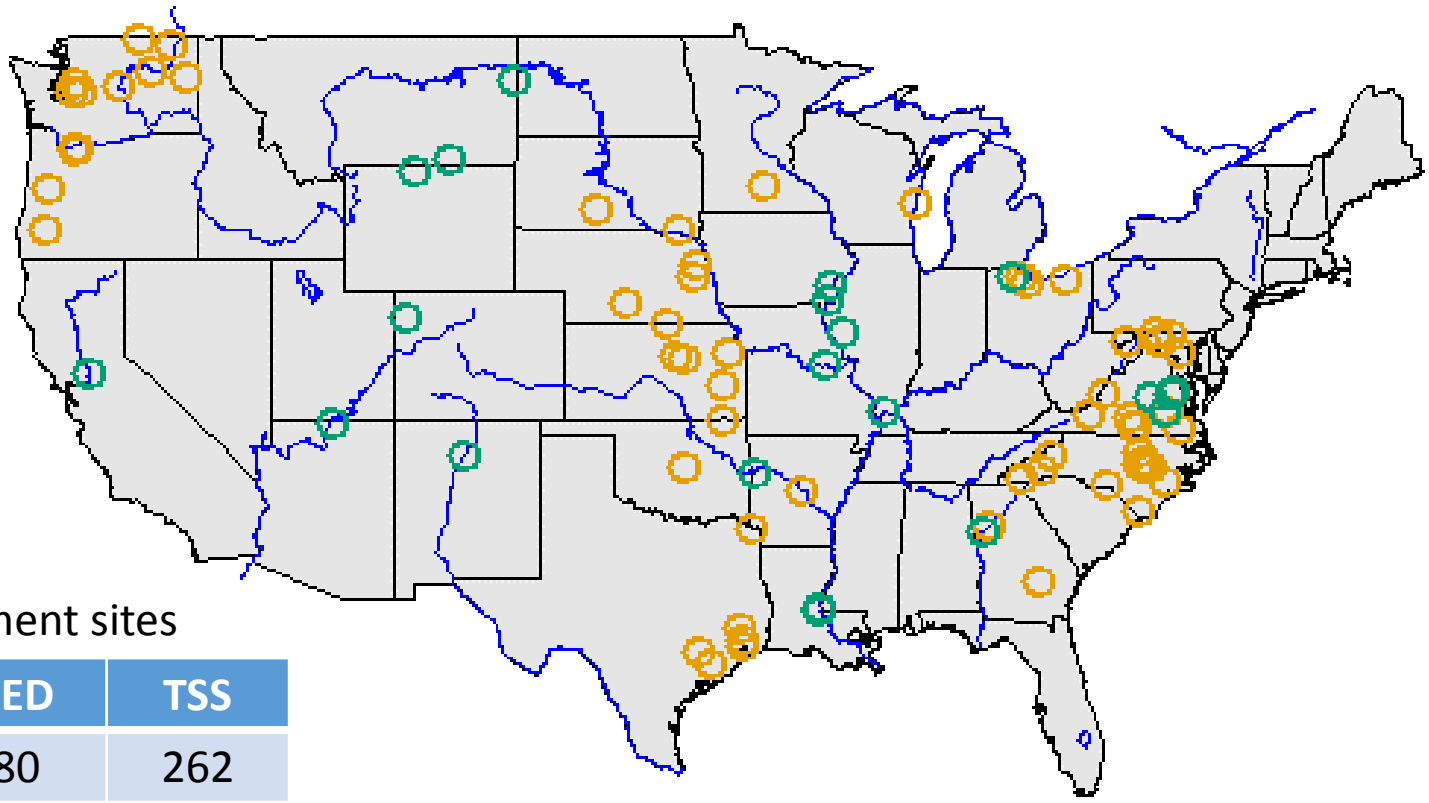


Number of sediment sites

Start year	SED	TSS
2002	80	262
1992	55	140

USGS

1982 – 2012 Sediment Trend Sites

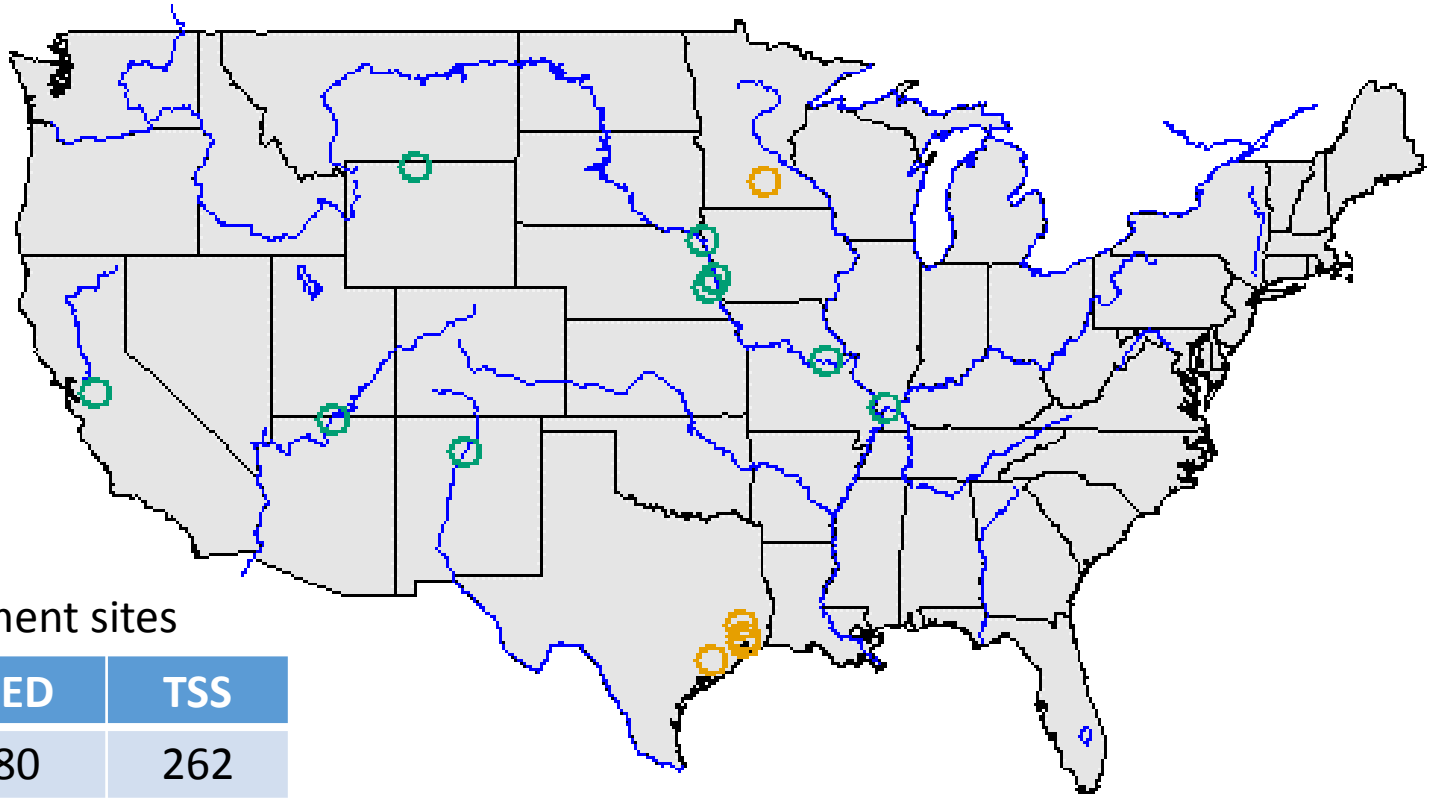


Number of sediment sites

Start year	SED	TSS
2002	80	262
1992	55	140
1982	21	66

USGS

1972 – 2012 Sediment Trend Sites



Number of sediment sites

Start year	SED	TSS
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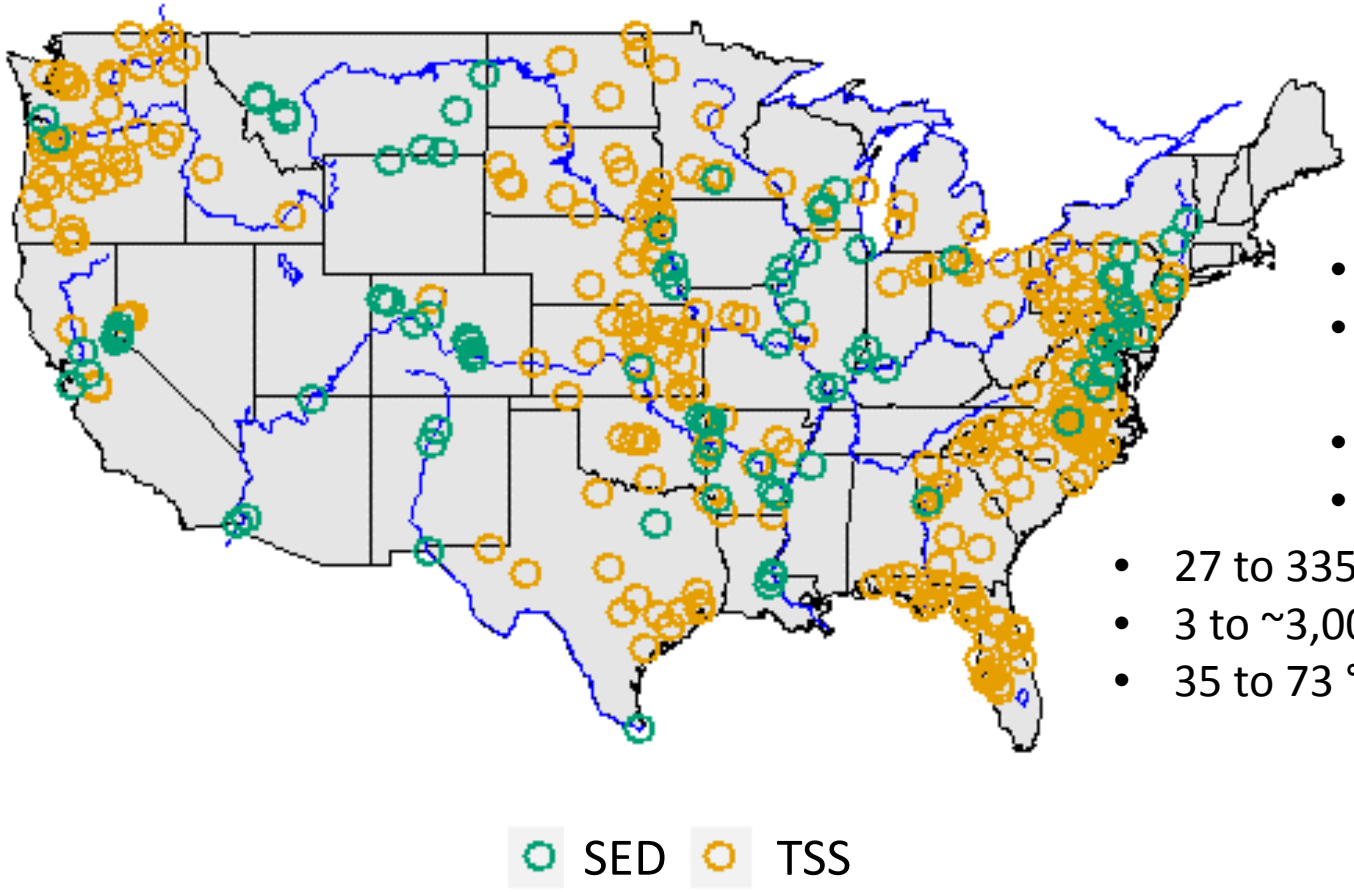
1982	21	66
1972	9	5

All Sediment Trend Sites



- 383 sites total
- 6 to 3,100,000 sq-km in drainage area
- 0 to 95 % urban
- 0 to 87 % agriculture
- 27 to 335 mm/yr of precipitation
- 3 to ~3,000 mm/yr in runoff
- 35 to 73 °F air temperature

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All Trends – Summary

	Suspended sediment (SED)
Total number of sites	94

….that passed data screens for at least 1 trend period

All Trends – Summary

	Suspended sediment (SED)	
Total number of sites	94	
Concentration trends	n	%
Increasing	22	23 %
Decreasing	62	66 %

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All Trends – Summary

	Suspended sediment (SED)	
Total number of sites	94	
Concentration trends	n	%
Increasing	22	23 %
Decreasing	62	66 %
Flux trends		
Increasing	19	20 %
Decreasing	54	57 %

All Trends – Summary

	Suspended sediment (SED)		Total suspended solids (TSS)	
Total number of sites	94		283	
Concentration trends	n	%		
Increasing	22	23 %		
Decreasing	62	66 %		
Flux trends				
Increasing	19	20 %		
Decreasing	54	57 %		

All Trends – Summary

	Suspended sediment (SED)		Total suspended solids (TSS)	
Total number of sites	94		283	
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Increasing	22	23 %	75	27 %
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Decreasing	62	66 %	122	43 %
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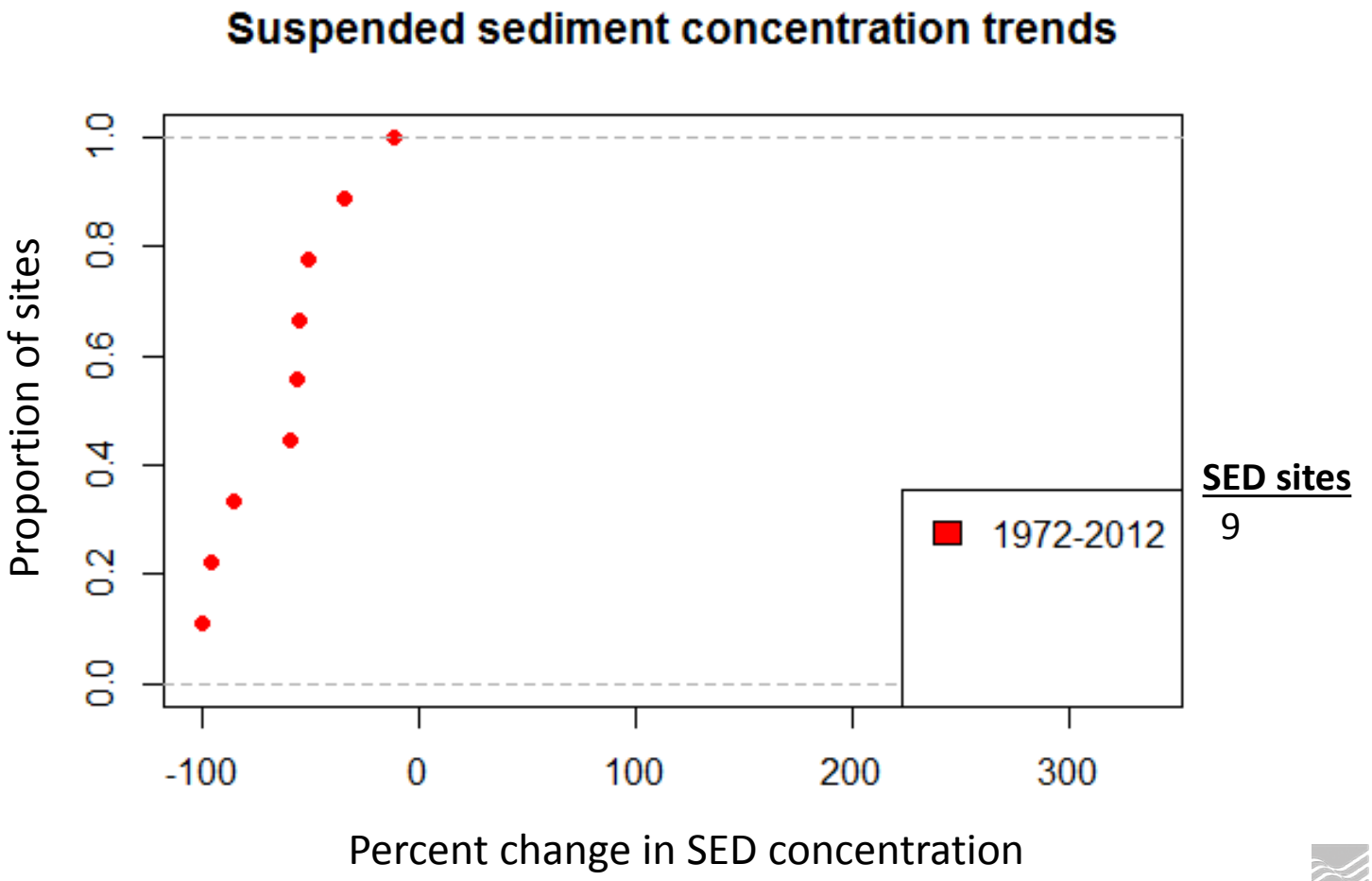
Percent Change by Trend Period



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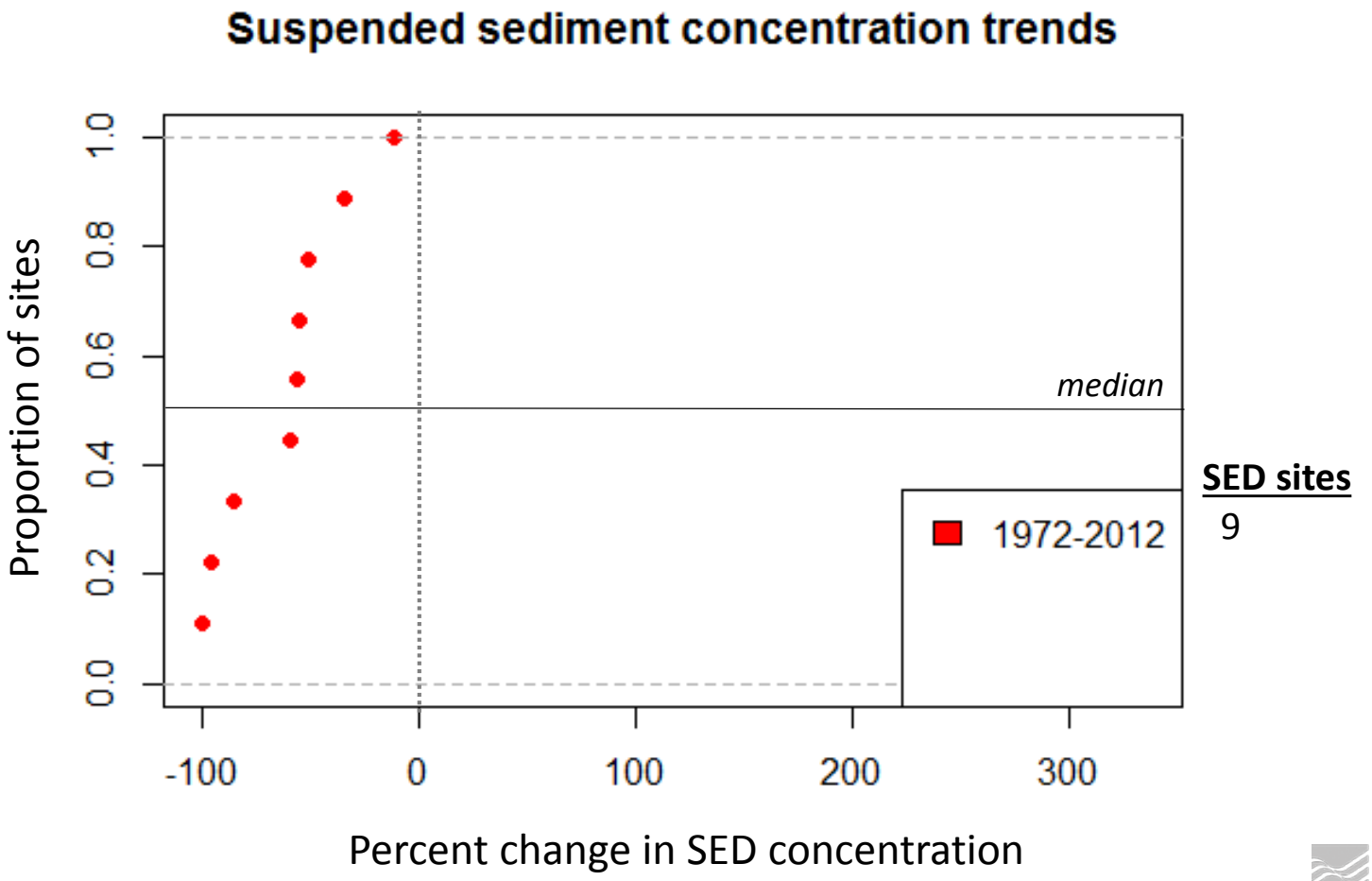

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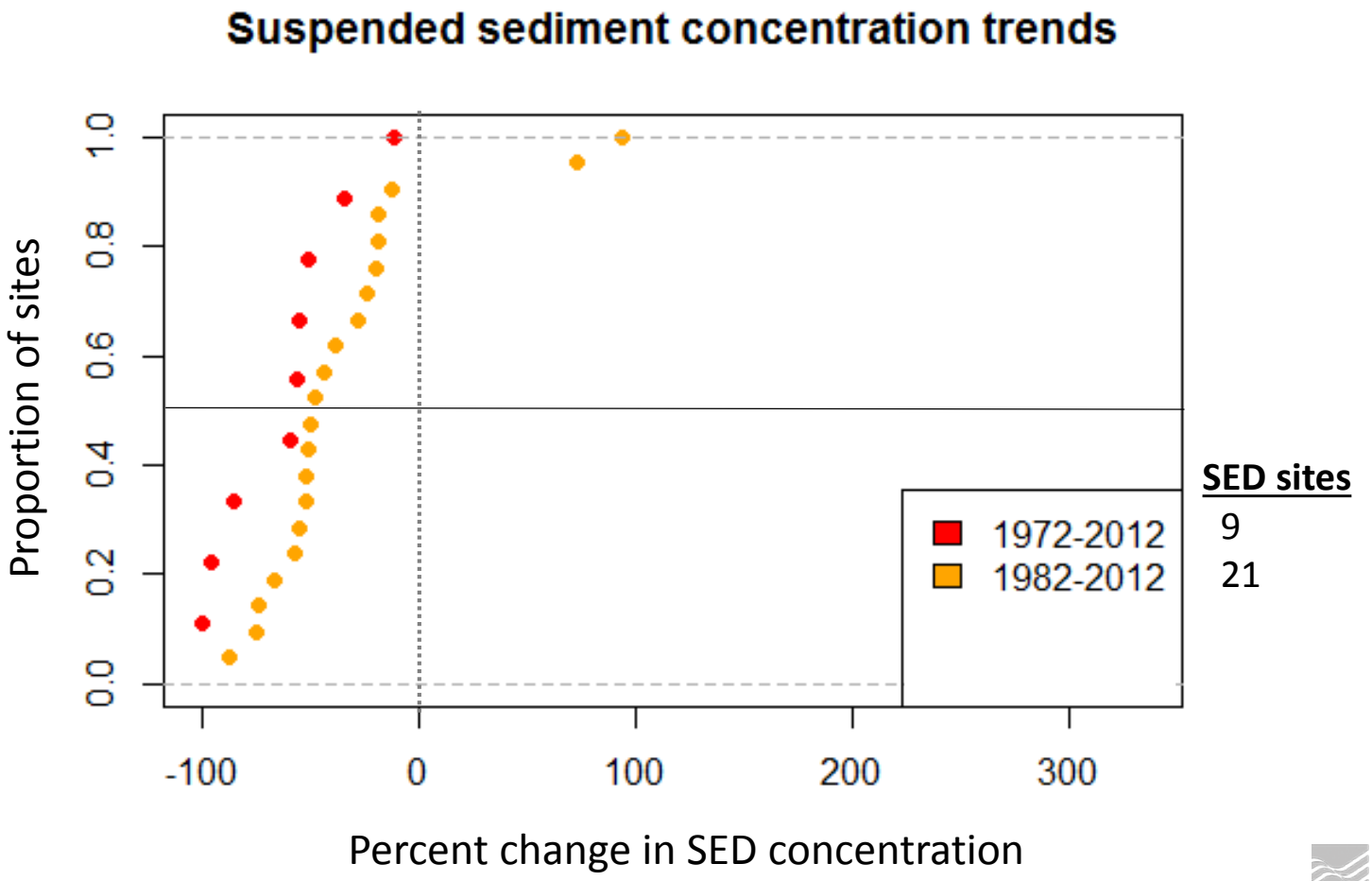

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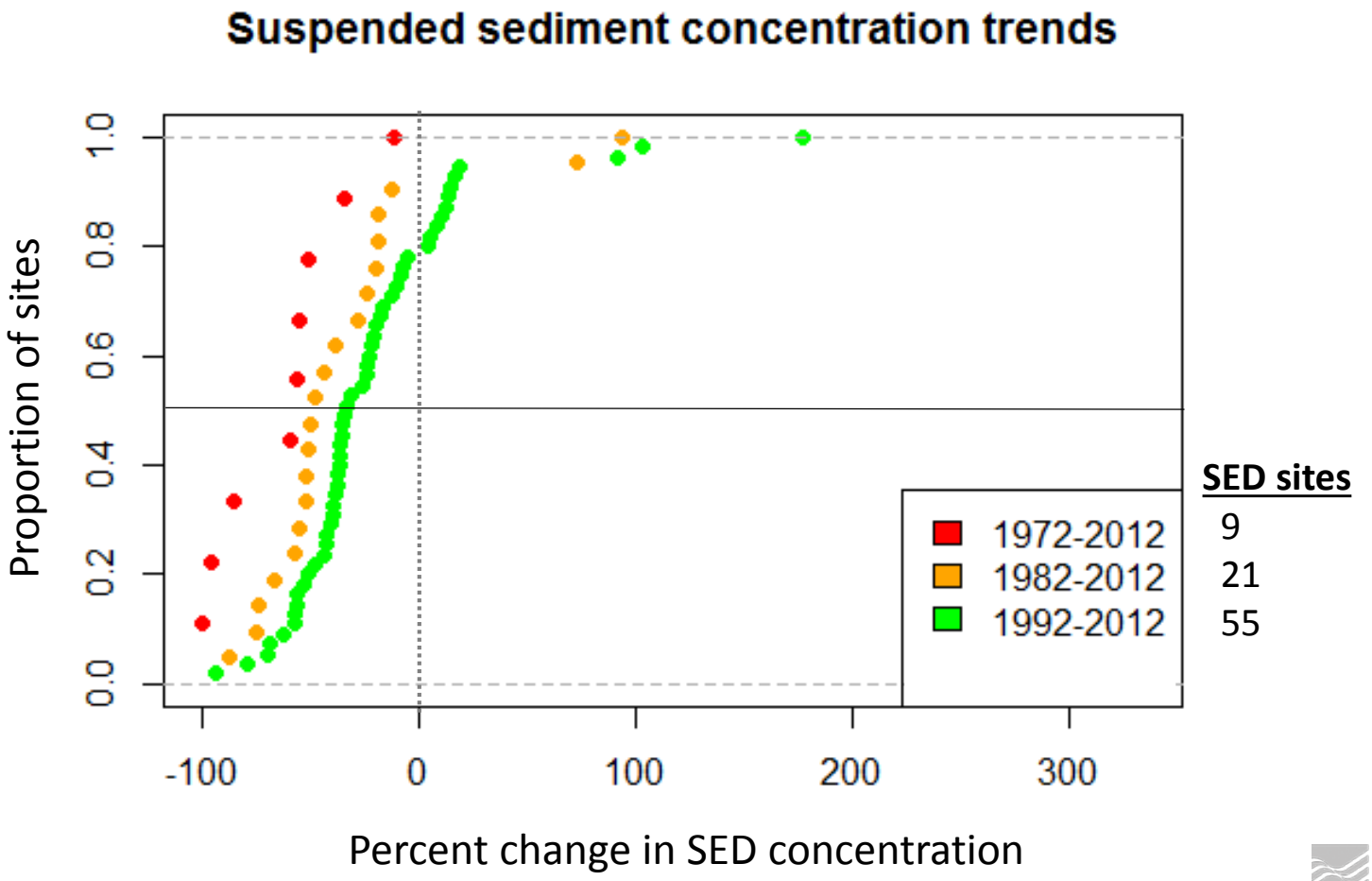

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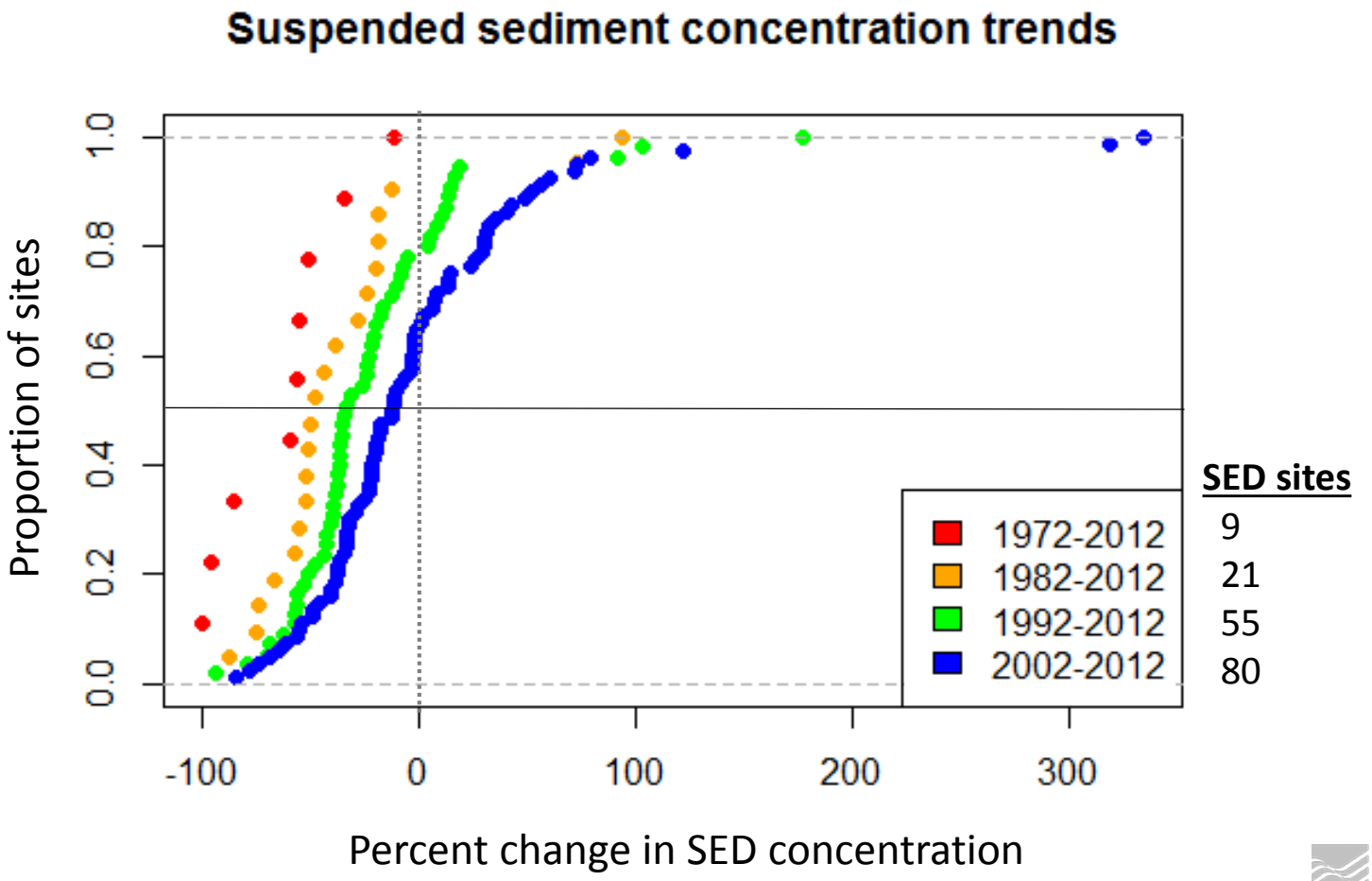
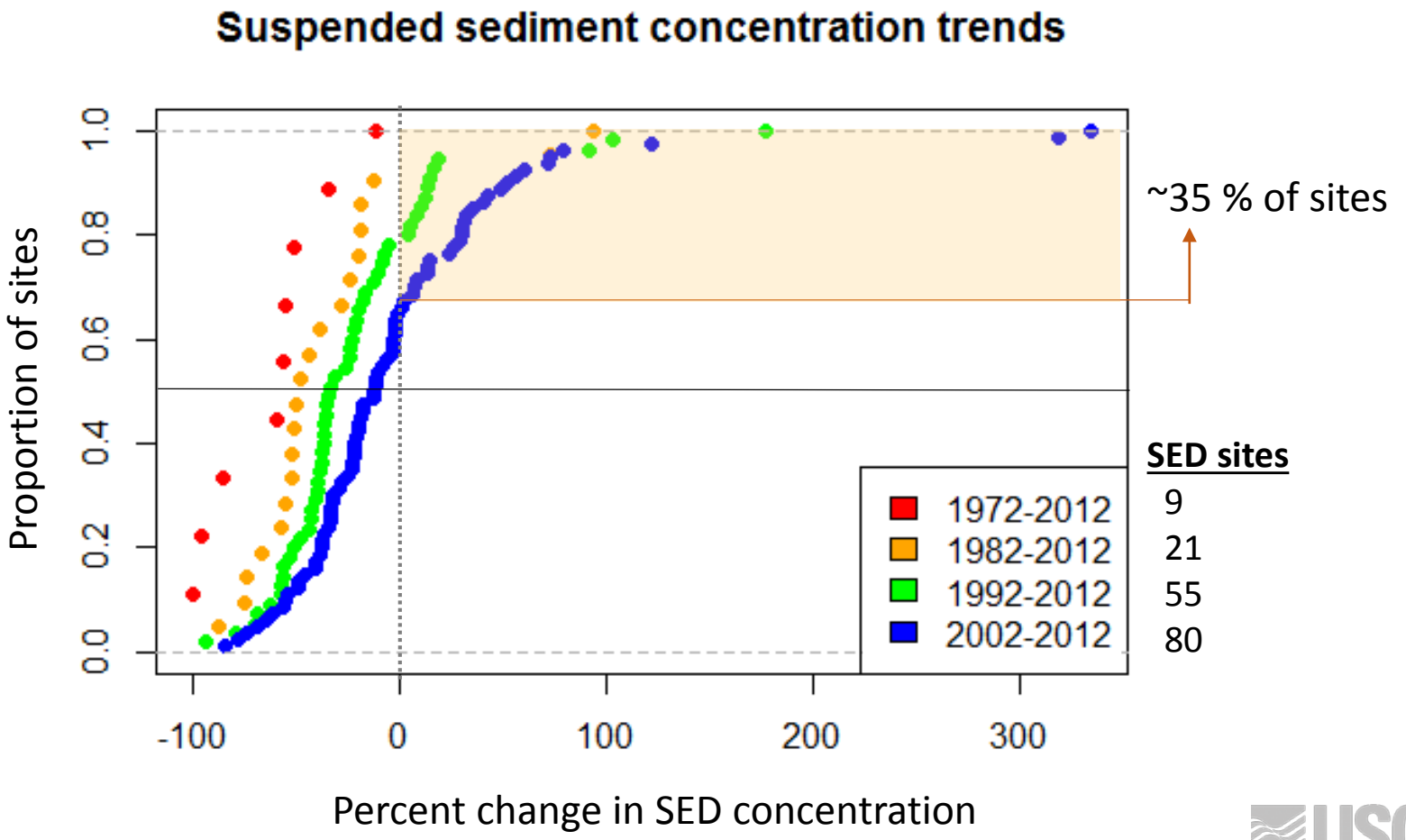
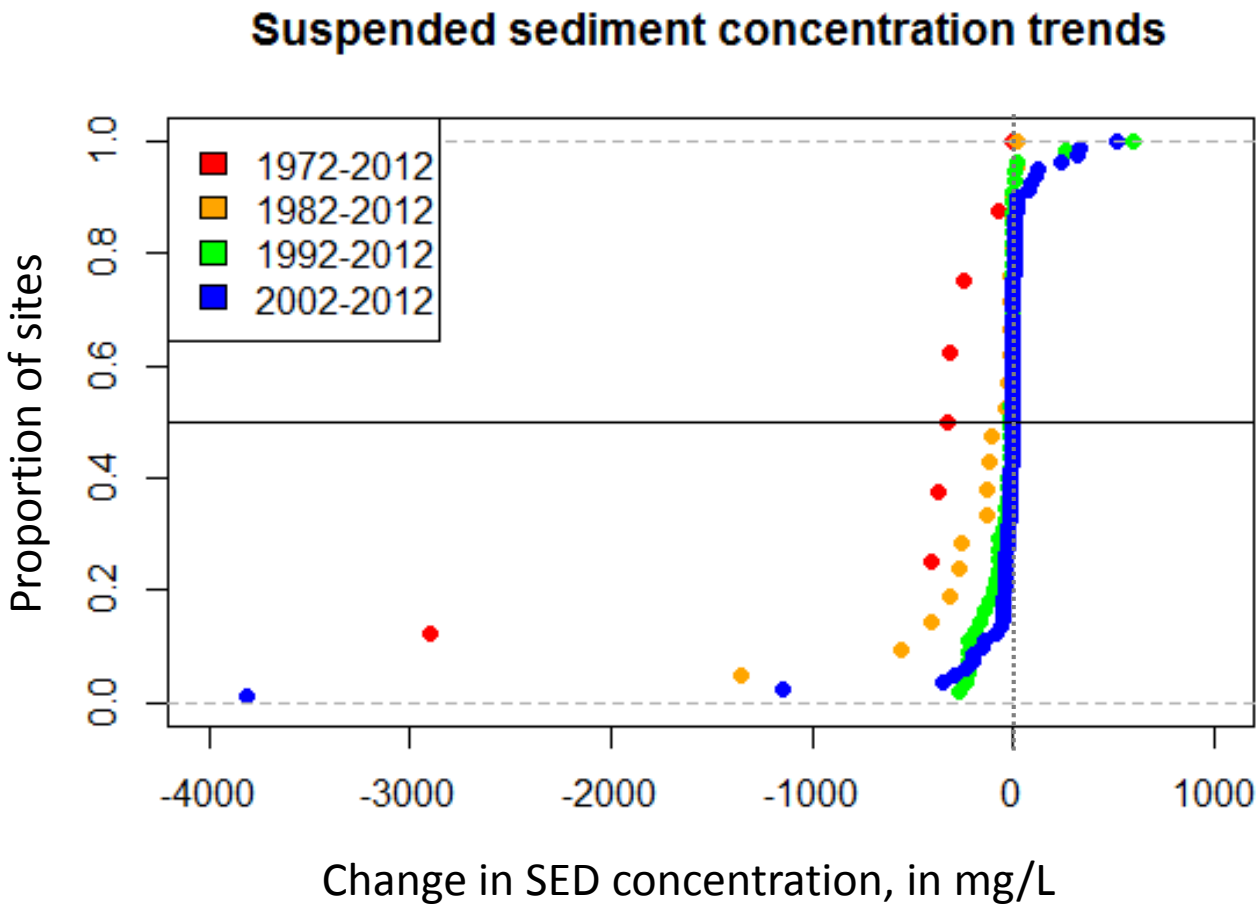


Percent Change by Trend Period



Change (mg/L) by Trend Period



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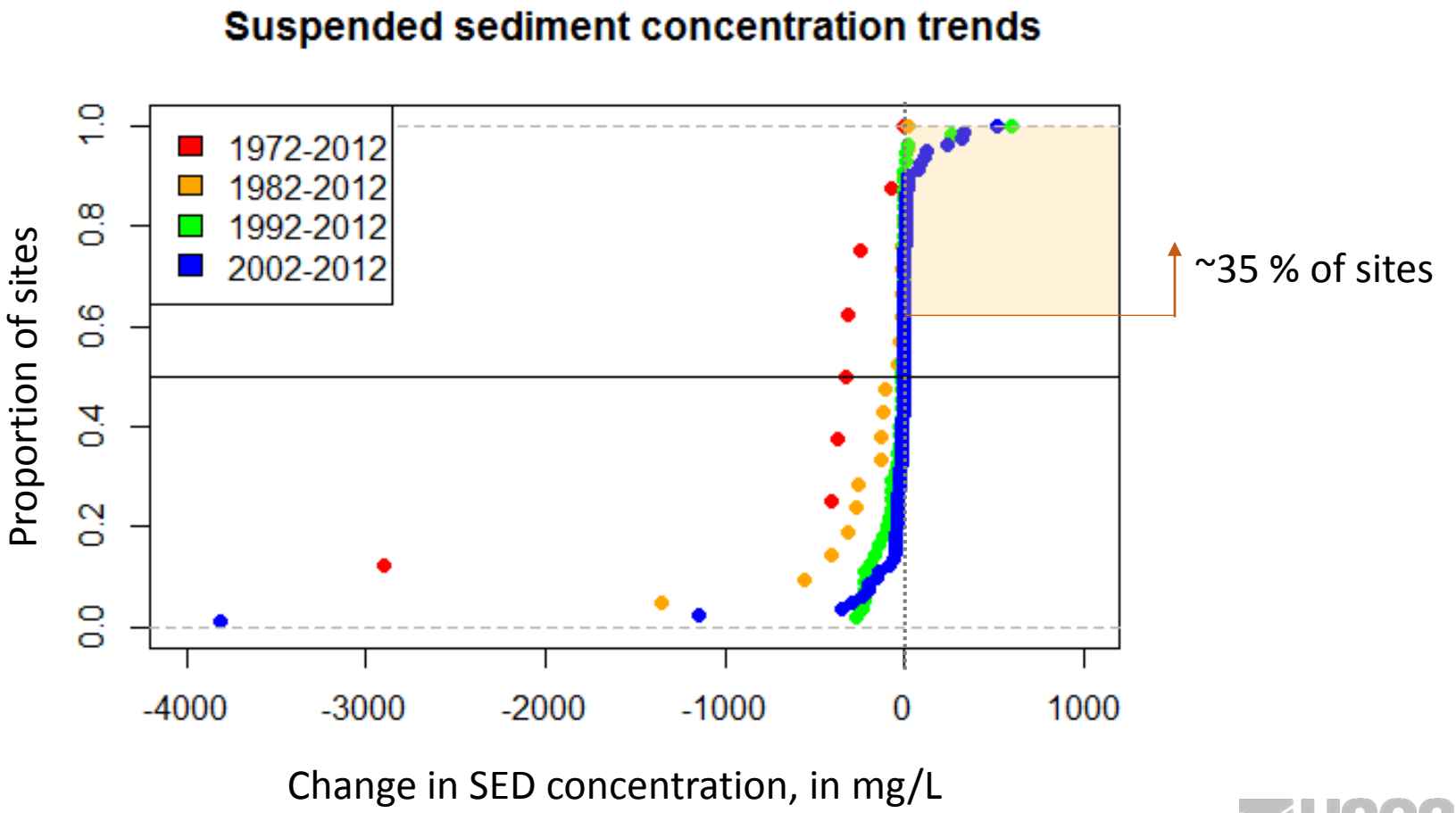

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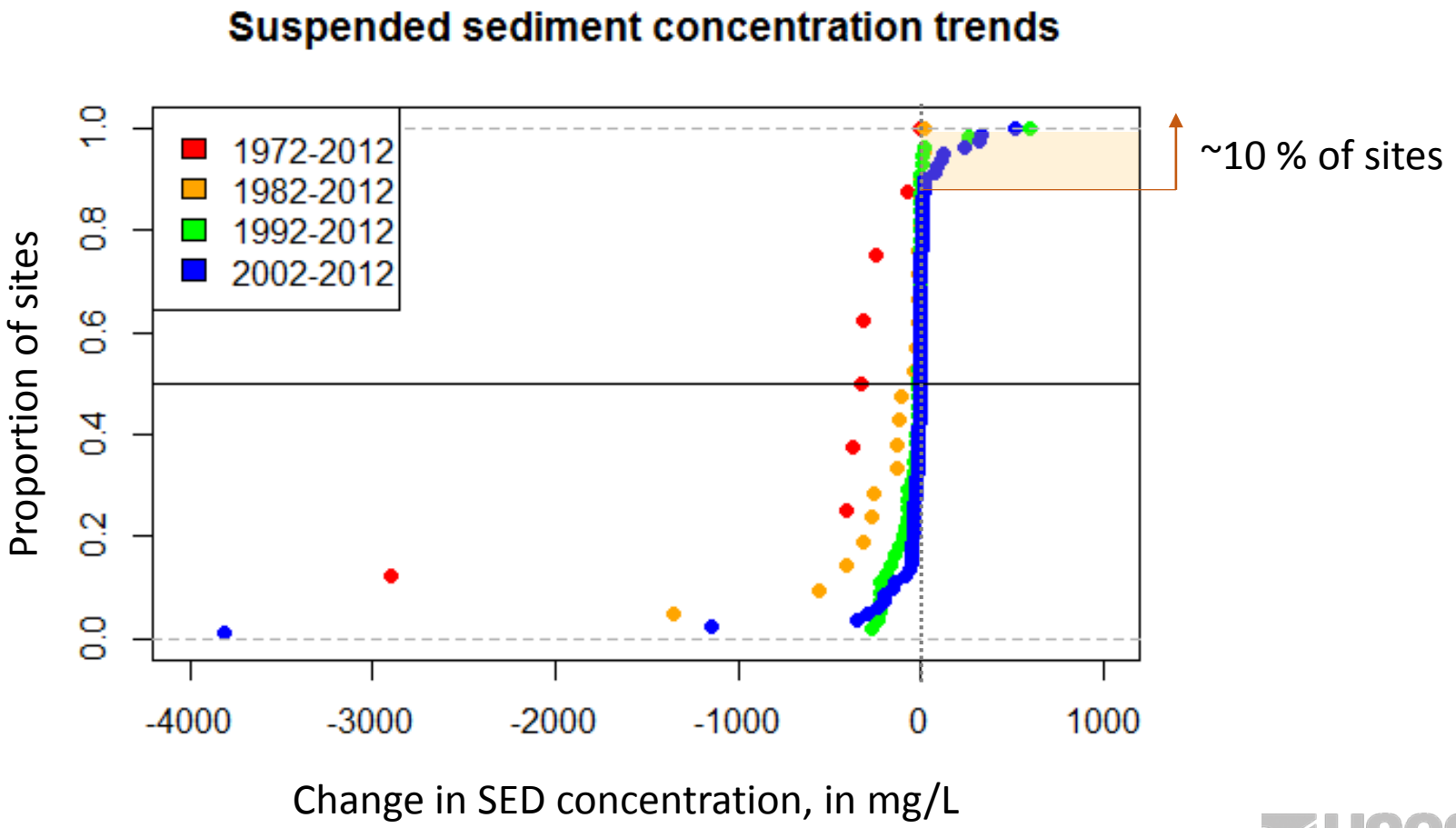
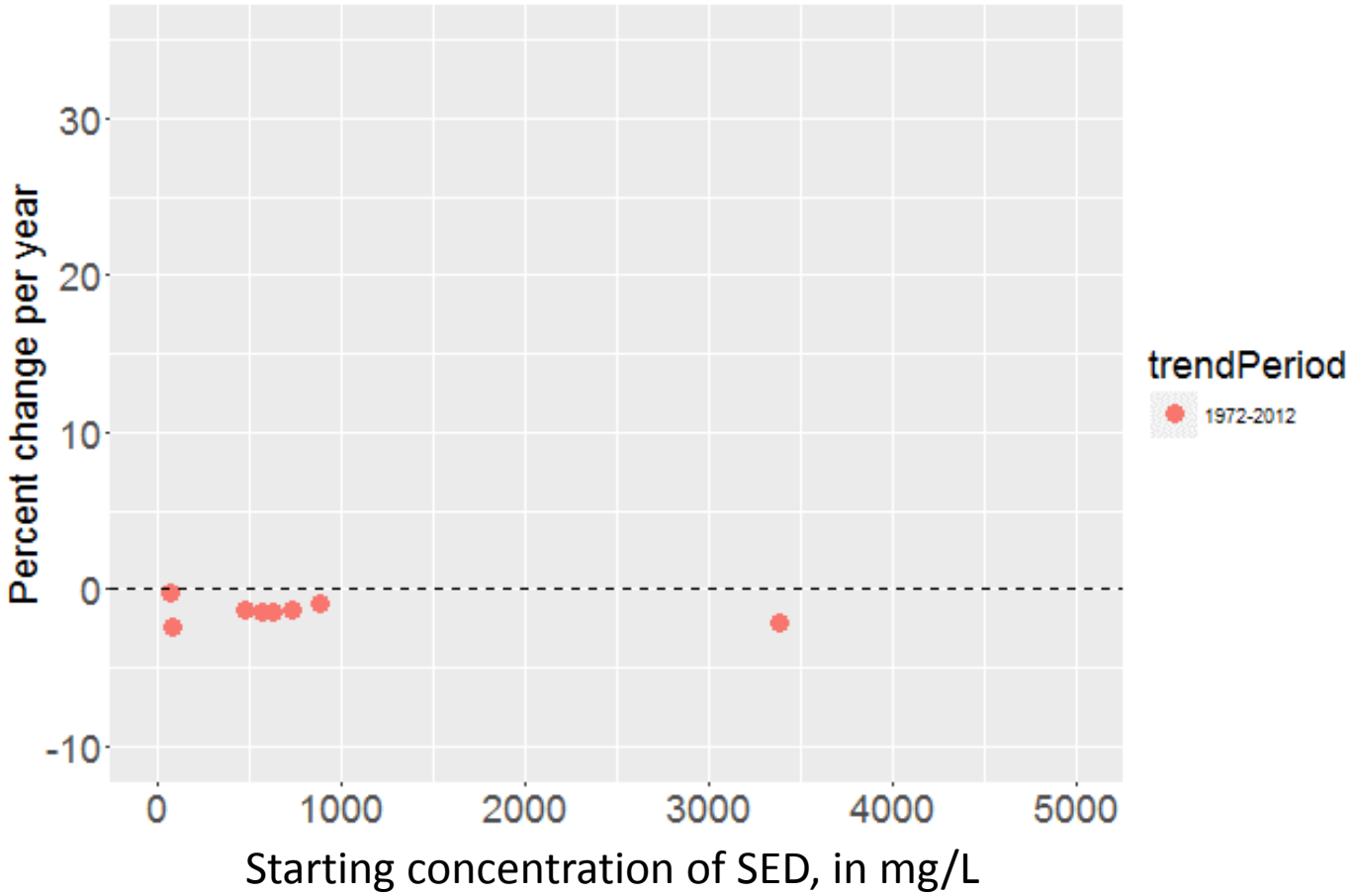


Starting Concentrations



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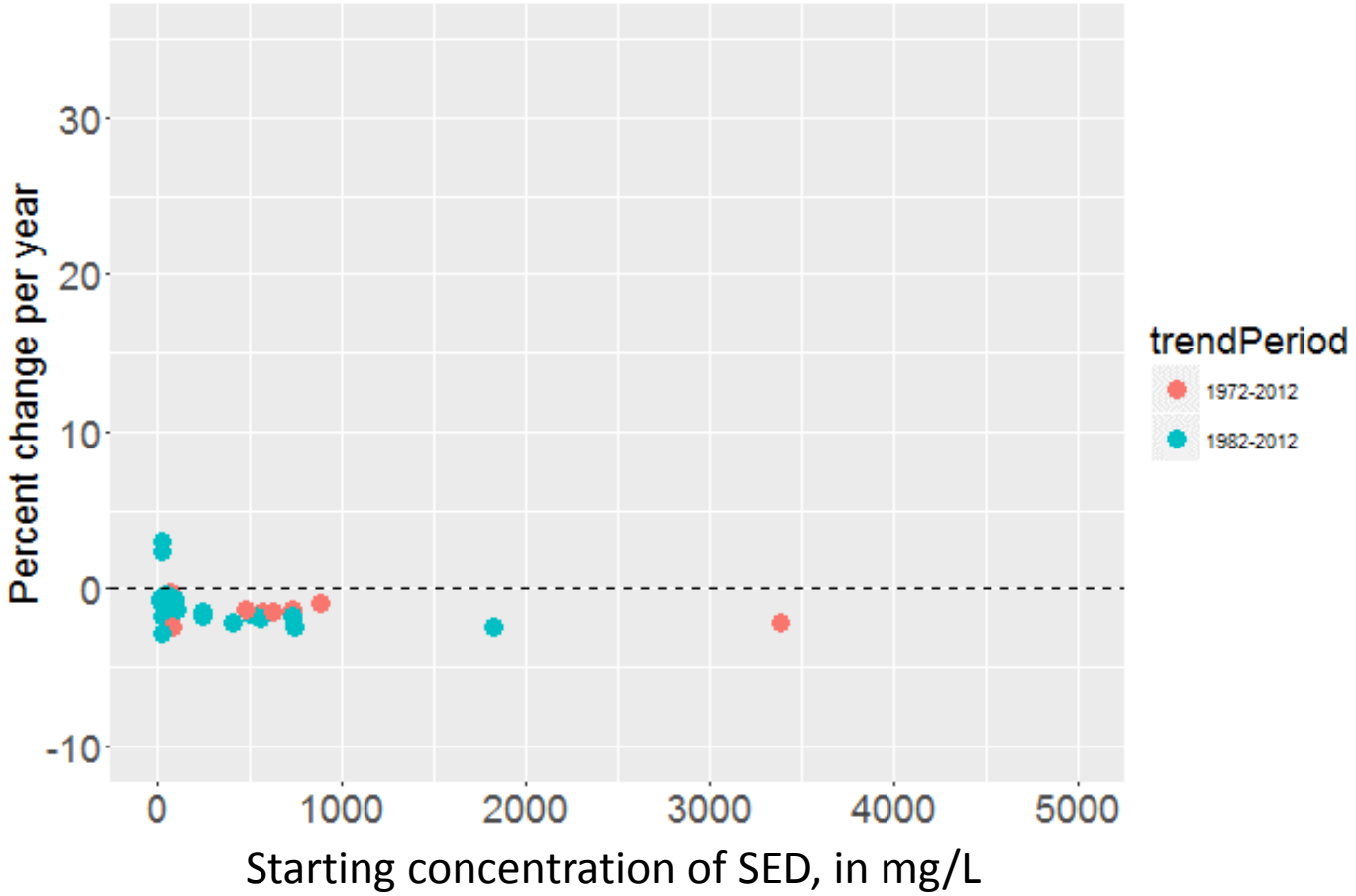

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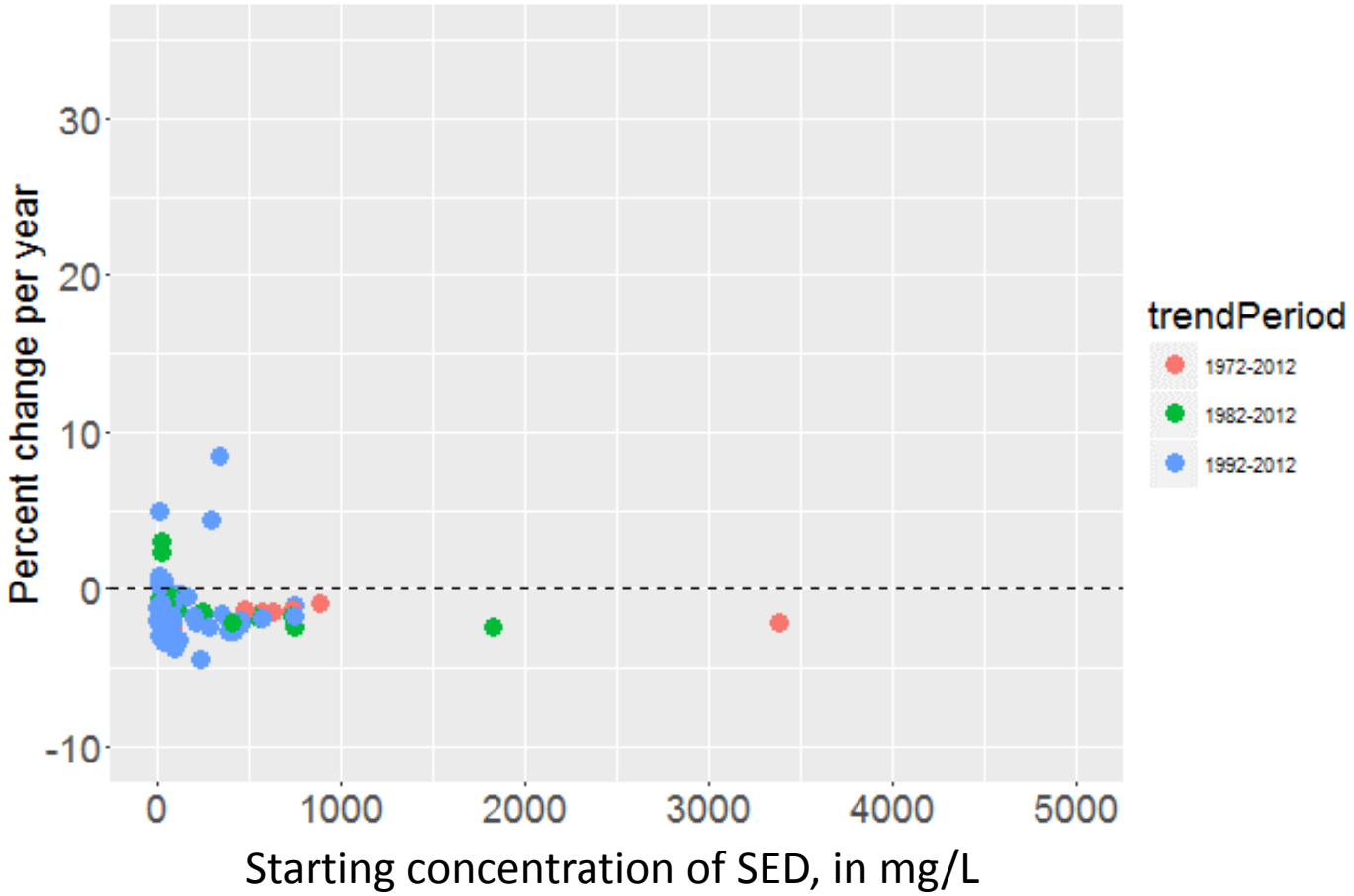

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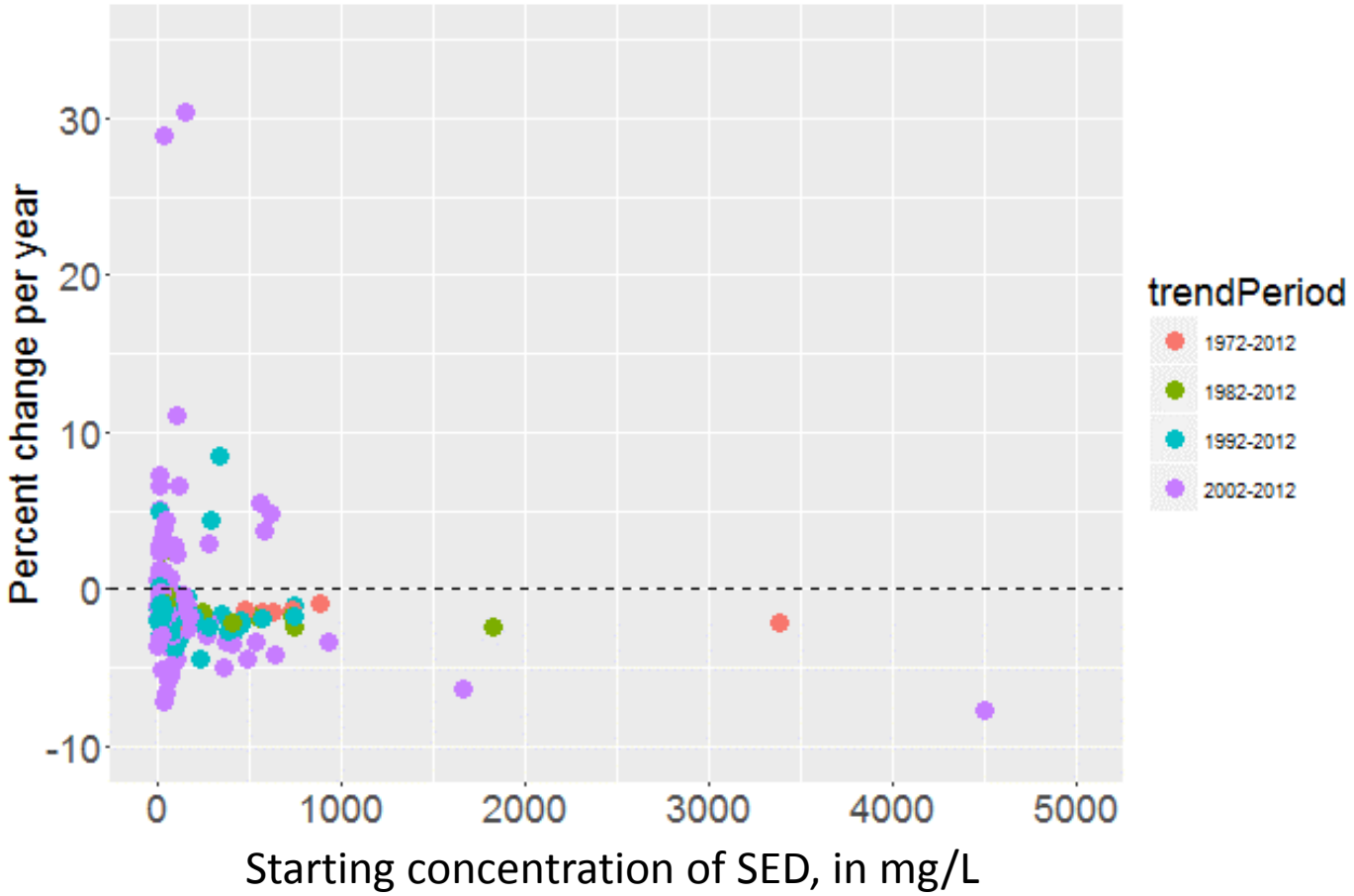

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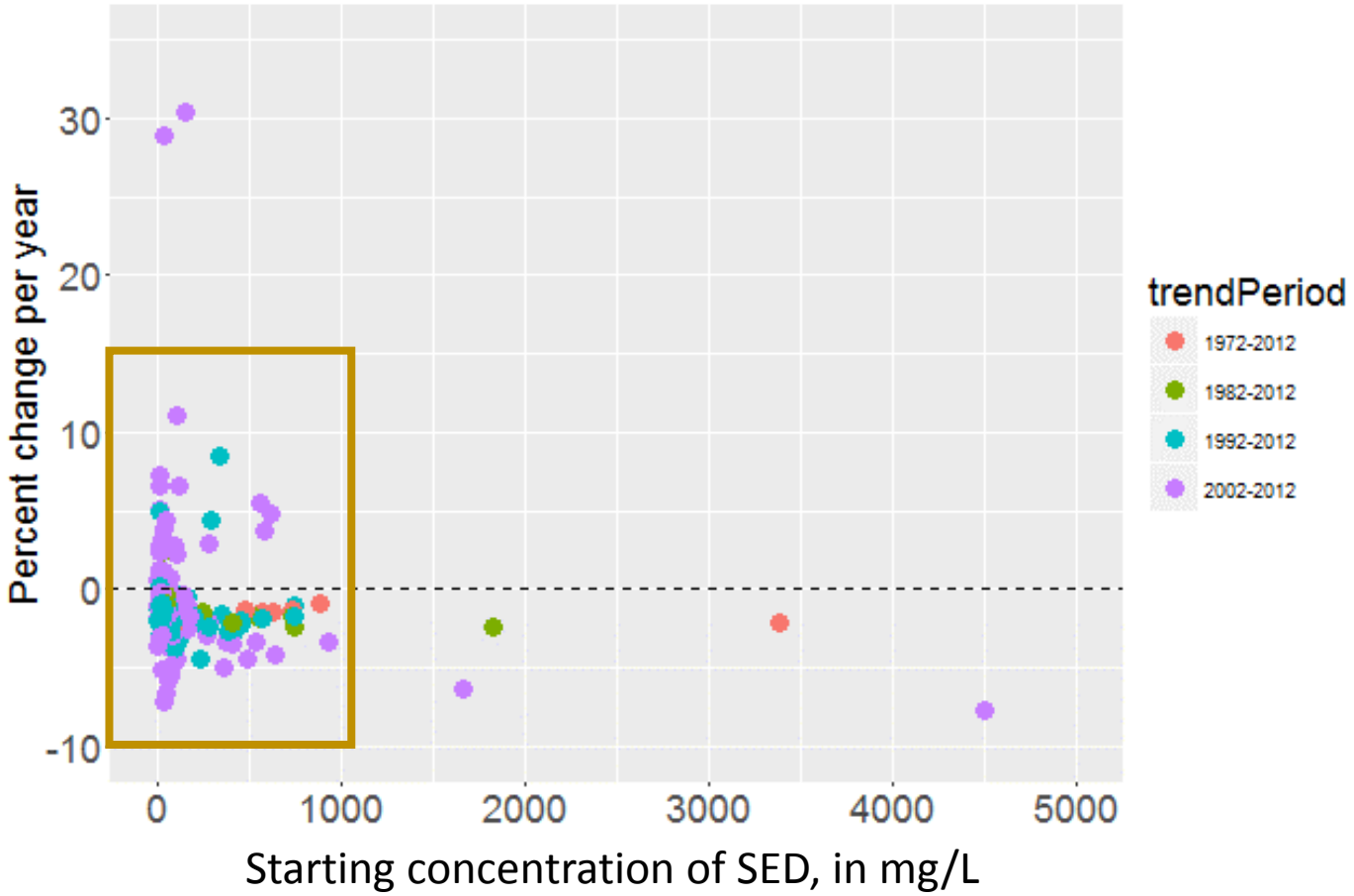

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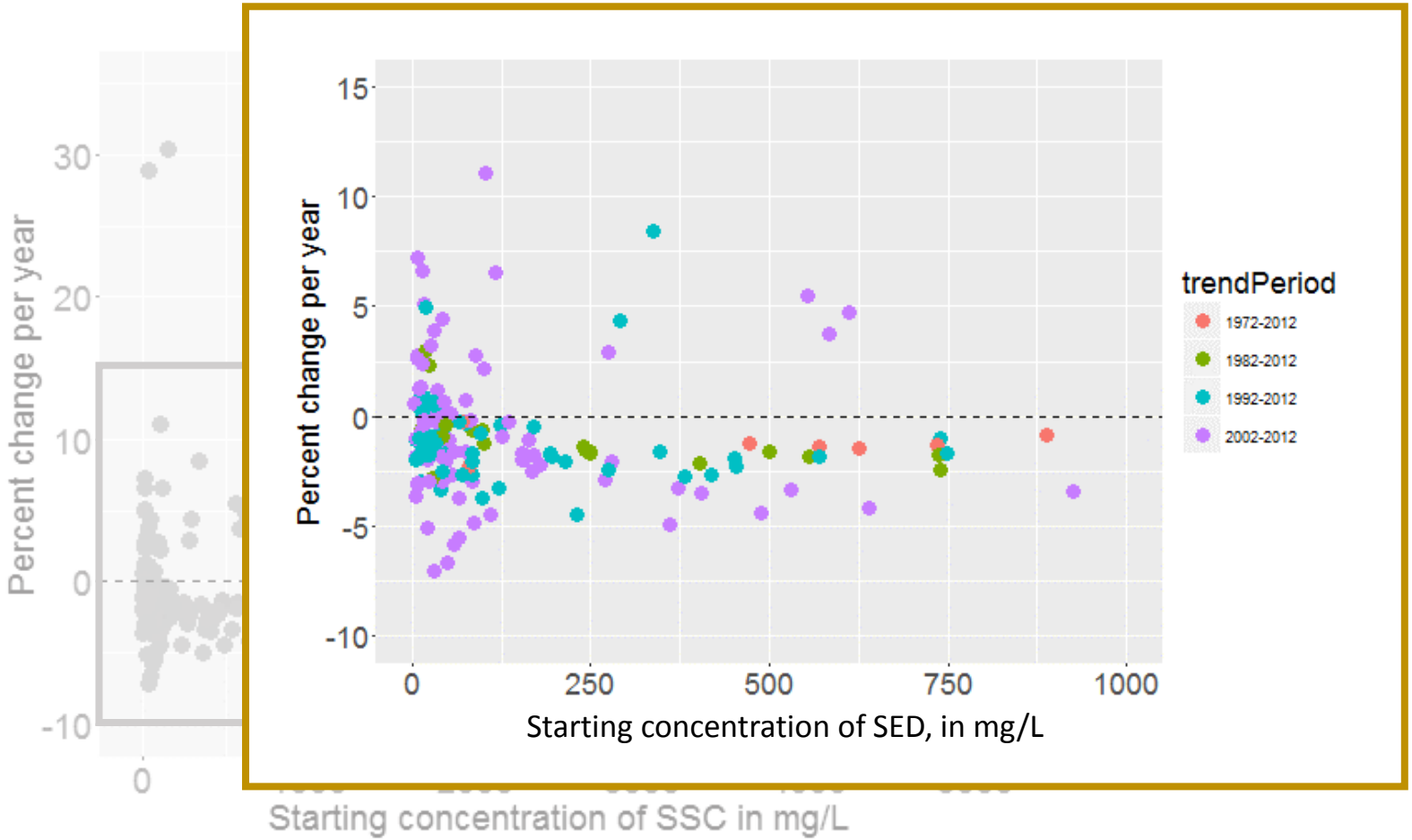
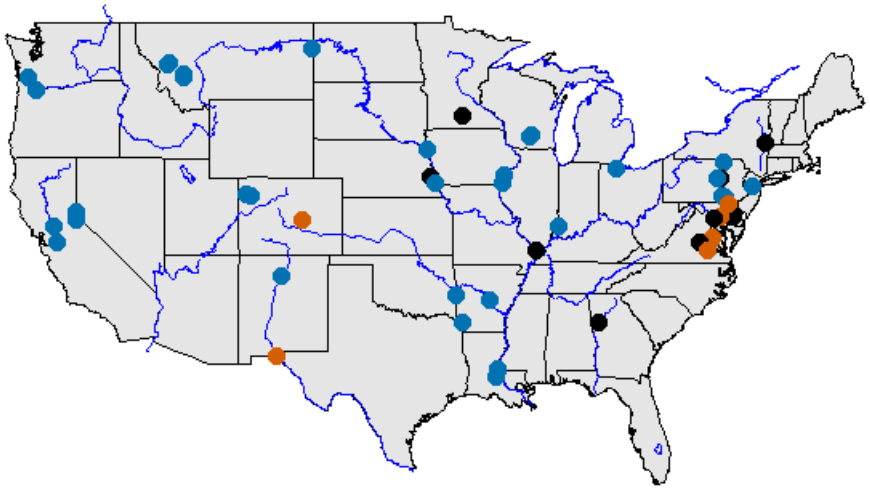


Geographic Perspective

SED trend sites, 1992-2012



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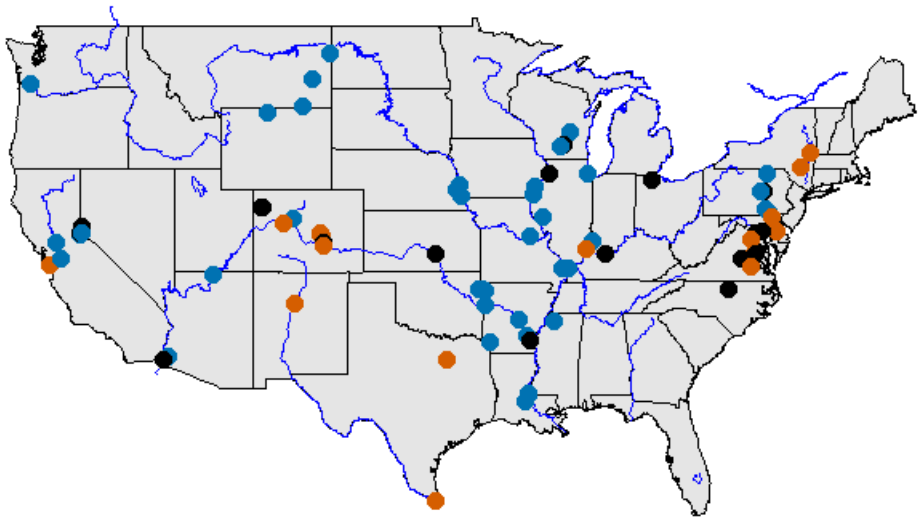

Trend direction:
- Low likelihood of change
- Decreasing concentration
- Increasing concentration

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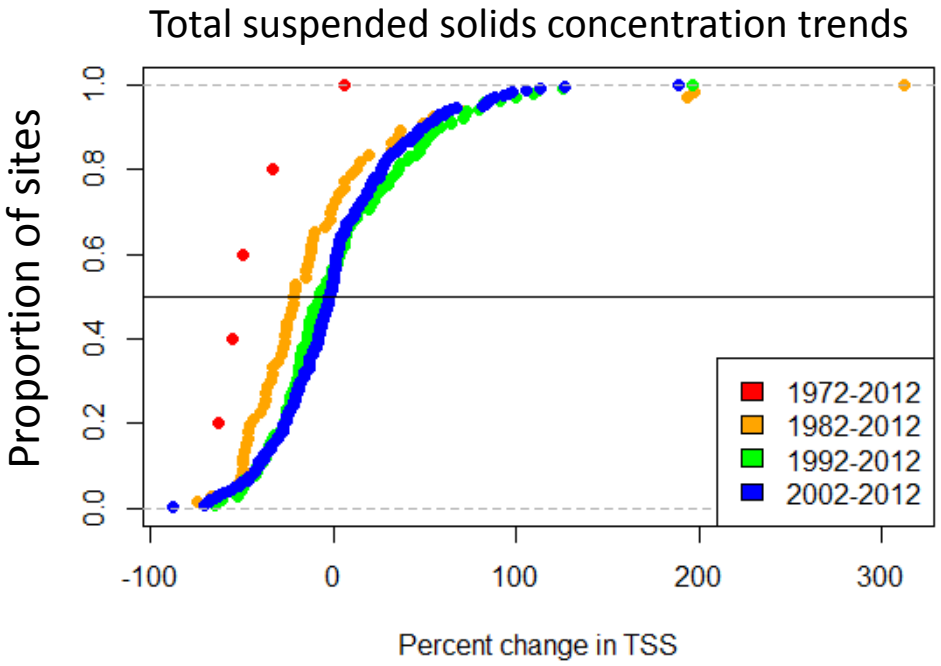
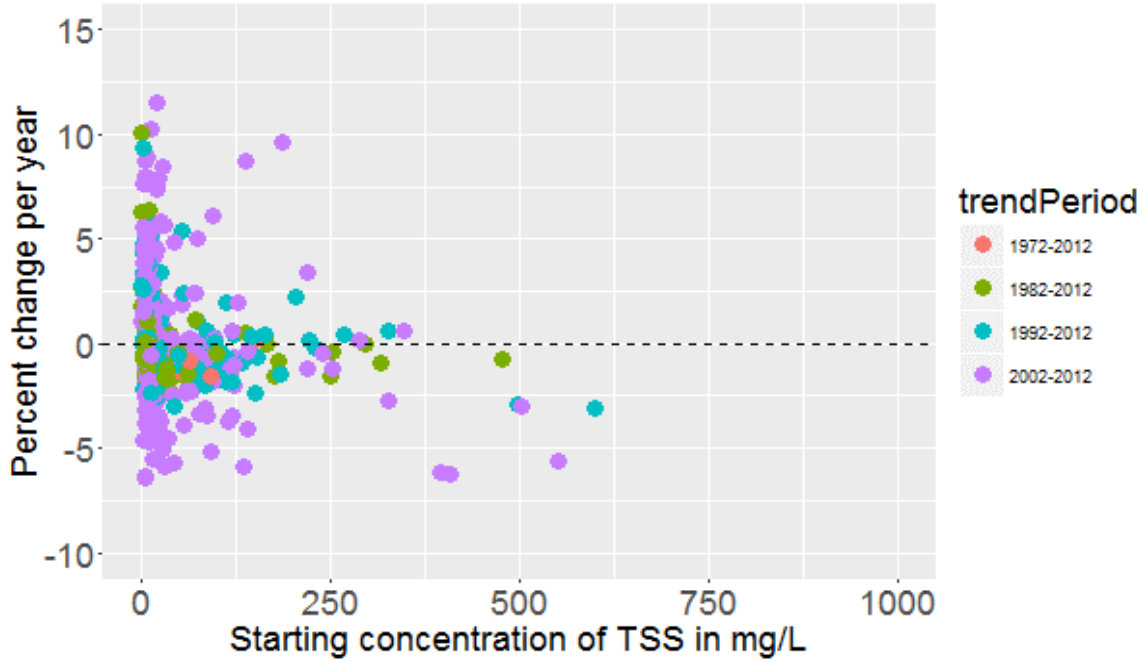
TSS by Trend Period





Future Directions

- 22,000 trend results across all constituents
- More formal summaries of results and explore the geographic distribution of trends

U.S. Geological Survey/photo by John Wirt

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- Causal analysis of trend results

U.S. Geological Survey/photo by John Wirt

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- Causal analysis of trend results
- Additional studies that consider specific aspects of trends

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Questions?

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